

axially parallel to the axis of the hydraulic plunger from the valve housing which permits to shorten the length of the hoses to the cylinder and annular chamber of the plunger with regard to the known arrangements, and which in particular takes the hoses out of the drive path of the operational personnel, so that obstructions of the personnel is avoided and the danger of damaging the hoses is reduced.

From the above description result a number of deviations for the expert which are to be included within the scope of the protection of the depending claims. None or the above-described extension housings can be secured to the check valve in an approximately arbitrary combination; furthermore extension housings with other functions could be secured. The check valve can be provided with more or less connection bores.

### Claims

1. Valve, in particular check valve, for hydraulic cylinders, in particular for hydraulic plungers in underground mining, with a valve housing and a switchable valve insert received therein, with connections for high pressure lines connected to the cylinder chamber and/or the annular chamber of the hydraulic cylinder, as well as with at least one connection for an additional unit such as a pressure limiting valve, a pressure sensor, and/or a pressure display, whereby the valve housing can be fixed to the hydraulic cylinder, **characterised in that** the connections (26, 27, 28, 29, 30, 31, 32; 125, 126, 127, 128, 129) run axially parallel to the axis (216) of the hydraulic cylinder (3) in its position fixed to the hydraulic cylinder (2).
2. Valve according to claim 1, **characterised in that** the connections (26, 27, 28, 29, 30, 31, 32; 125, 126, 127, 128, 129) at the valve housing (21; 121) are arranged at the top at the valve housing (21; 121) in its position fixed at the hydraulic cylinder (3).
3. Valve according to claim 1 or 2, **characterised in that** the inner side (180) of the valve housing (21; 121) facing the hydraulic plunger (3) in the mounted state of the valve (20, 120) is adapted to the outer contour of the hydraulic cylinder (3).
4. Valve according to one of claims 1 to 3, **characterised in that** the valve housing (21; 121) is provided with a recess (38; 224) at its plunger-side inner side (180), which overlaps a mounting plate (175) arranged at the hydraulic cylinder (3) in the mounted state of the valve (20; 120).

5. Valve according to claim 4, **characterised in that** the mounting plate comprises a hydraulic inlet to the cylinder chamber of the hydraulic plunger.
6. Valve according to one of claims 1 to 5, **characterised in that** the valve housing (21; 121) is provided with at least one transverse bore (39; 139) for receiving a fastening screw which can be screwed through the transverse bore into an associated thread bore at the hydraulic cylinder (3) and/or into a thread bore at the fastening plate (175) flush therewith.
7. Valve according to one of claims 1 to 6, **characterised in that** the connections (25 – 32; 125 – 129) are arranged in at least two stages at the valve housing (21; 121), with a first, lower stage (25; 117) near the inner side (180) and a second, higher stage (24; 224) near the outer side (190) of the valve housing (21; 121).
8. Valve according to claim 7, **characterised in that** the connections (26, 27, 28; 125, 126, 127) for the high pressure lines (11, 12, 17; 111, 112) and/or for the pressure display (124) are arranged in the higher stage (24; 124).
9. Valve according to claim 7 or 8, **characterised in that** the connections (128, 129) for the pressure limiting valve (212) and/or the pressure sensor (213) are arranged in the lower stage (117).
10. Valve according to one of claims 7 to 9, **characterised in that** the lower stage (117) is formed by countersinks (210) at the upper side (215) of the valve housing (121).
11. Valve according to one of claims 1 to 10, **characterised in that** transverse bores (222) arranged respectively in pairs for the reception of U-shaped locking clamps (230) are associated with the connections (125, 126, 127, 128, 129).
12. Valve according to one of claims 1 to 11, **characterised in that** the side of the valve housing (121) facing the connections (125, 126, 127, 128, 129) comprises a chamfer (130) and/or the bottom side of the valve housing (21) comprises a chamfer.
13. Valve according to one of claims 1 to 12, **characterised in that** the valve housing (121) is provided with a recess (231) in the region in front of the higher stage (124).
14. Valve, in particular check valve for hydraulic plungers of shield-type support frames according to one of claims 1 to 13, **characterised by** at least one fastening means for an

extension housing (40; 50; 80) which can be mounted in a releasable manner to one of the side walls (22A, 22B) of the valve housing (21) for additional hydraulic functions of the shield-type support frame.

15. Valve according to claim 14, **characterised in that** the fastening means consist of thread bores (19) in one or preferably in both side walls (22A; 22B) of the valve housing (21).

16. Valve according to claim 14 or 15, **characterised in that** the valve housing (21) comprises a hydraulic outlet (36) to the cylinder chamber of the hydraulic plunger (3) at the rear side or at the bottom side.

17. Valve according to one of claims 14 to 16, **characterised in that** the extension housing (50) comprises a hose connection (54) and connection receptions (53) for function elements for actuating a corner cylinder (7) of the shield-type support frame (1).

18. Valve according to claim 17, **characterised in that** the extension housing (80) comprises a reception bore for a pressure control valve (75) as a function element for actuating the corner cylinder.

19. Valve according to one of claims 14 to 18, **characterised in that** the extension housing (80) is provided with connection receptions for function elements for controlling a movement of only one horizontal skid (2) of the shield-type support frame (1).

20. Valve according to claim 19, **characterised in that** the extension housing (80) comprises connection receptions for a pressure limiting valve (85), and a hydraulically openable check valve (81).

21. Valve according to one of claims 14 to 20, **characterised in that** one side wall (22B) of the valve housing (21) is provided with a shut-off connection bore (61) connected to the high pressure connection (26) for the cylinder chamber and/or with a shutable connection bore (63) connected to the high pressure connection (28) for the annular chamber and/or with a shutable connection bore (64) connected to the hydraulic outlet (36).

22. Valve according to one of claims 17 to 21, **characterised in that** the extension housing (50; 80) is provided with a connection channel (56; 83) arranged flush with the annular chamber connection bore (63) arranged at the housing wall (57; 87) facing the valve housing (21).

23. Valve according to one of claims 17 to 22, **characterised in that** the housing wall (57; 87) of the extension housing (50; 80) additionally comprises a connection channel (82; 55) arranged flush with the cylinder chamber connection bore (61) and/or the hydraulic outlet connection bore (54).

24. Valve according to one of claims 14 to 23, **characterised in that** an extension housing (40) provided with a pressure intensifier (44) can be connected to a side wall (22A) of the valve housing (21), whereby the pressure intensifier (44) preferably comprises an oscillating amplifier piston.

25. Valve according to claim 24, **characterised in that** the extension housing (40) comprises connection receptions for a throttle (46) preceding the inlet of the pressure intensifier and/or for a pressure reduction valve (44) preceding the pressure intensifier.

26. Valve according to one of claims 14 to 25, **characterised in that** the side wall (22A) of the valve housing (21) comprises a first shut-off connection bore (35) connected to the hydraulic outlet (36) and a second shut-off connection bore (61) connected to the high pressure line connection (26).

27. Valve according to one of claims 14 to 26, **characterised in that** the hose connections (54) and connection receptions (53) are axially parallel to the hydraulic plunger (3).

28. Shield-type support frame with horizontal skids (2), a canopy (4), telescopic hydraulic plungers (3) supporting the canopy with regard to the horizontal skids (2), and a check valve (20; 120) associated with each hydraulic plunger, **characterised in that** the check valve (20; 120) is formed according to one of claims 1 to 27.